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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/669,784	09/25/2000	Gordon Israelson	00P7919US	3754

7590 11/27/2002

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ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 11/27/2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 14

Application Number: 09/669,784
Filing Date: September 25, 2000
Appellant(s): ISRAELSON, GORDON

John P. Musone
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed September 26, 2002.

(1) Real party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellants' statement of the status of amendments after final rejection contained in the brief is correct. The after final amendment filed on May 29, 2002 to correct a minor error has been entered.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

The rejections of claims 1-18 stand or fall together and claims 19-20 stand or fall together as stated in the brief.

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

The following is a listing of the prior art of record relied upon in the rejection of claims under appeal.

Number	Name	Date
GB 2,289,286	Willis	11/95
US 4,202,865	Preston, Jr. et al.	05/80
US 4,978,439	Carnell et al.	12/90

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

(I) Claims 1-3,5-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Willis (GB 2,289,286A) in view of Preston, Jr. (US 4,202,865), which is given in the final rejection dated April 23, 2002. The rejection is repeated below for convenience.

Willis teaches a process to remove hydrogen sulphide from gas. A natural gas stream containing hydrogen sulphide is subjected to membrane separation to divide the stream into a minor permeate (sulfur concentrated) stream of increased hydrogen sulphide content, and a major impermeate (sulfur lean) stream of decreased hydrogen sulphide content. Prior to the membrane separation step, the gas stream is pressurized to be in the range 10-100 bar abs (1000-

10,000 kPa). Typical membrane materials used include polysulphones, cellulose acetate, polyimides, polycarbonates, polyamides, polyetherimides and sulphonated polysulphones. The permeated stream is treated with a regenerable liquid (amine wash) to reduce its hydrogen sulphide content to form a first product stream. The impermeate stream is treated with a non-regenerable solid hydrogen sulphide absorbent, such as zinc oxide, to give a second product stream. The first and second product streams are then combined (i.e., passing the sulfur concentrated stream to the main feed stream downstream from the separation membrane). It is found that 87% of the hydrogen sulphide is removed by the amine wash step yet the gas flow rate therethrough is only 29% of the feed gas flow rate, i.e., gas flow rates are measured in the process. Typically the second product stream, i.e., the effluent from the solid, non-regenerable absorbent treatment stage, has a hydrogen content below 1 ppm and is then mixed with the first product stream, i.e., the product from the regererable liquid treatment stage. See Abstract, Page 2, Lines 28-32; Page 4, Lines 17-24; Page 5, Lines 1-3,12-14.

However, Willis does not teach the use of the resulting feed fuel for a fuel cell system. Preston, Jr. discloses that reduction in the sulphur content in the fuel feed is desirable for economic considerations relative to the life and performance of the steam reform reactor catalyst in fuel cell power plants. See Column 1, Lines 15-25. Therefore, it would have been obvious to one of ordinary skill in the art to operate fuel cell power plants using a desulphurized natural gas as the feed for the reforming operation, because Preston, Jr. teaches low sulphur content is critical for the life and performance of the power plant. In addition, the disclosure of Willis differs from Applicant's claims in that Willis does not specifically discuss the sulfur lean stream

containing no more than 0.2 ppm of sulfur compounds. It is the position of the examiner that the criticality on the sulphur content after the membrane separation does not provide patentable distinction. In particular, the membranes used in the Willis reference are similar to those cited in the instant specification. Similarly, the criticality on the sulphur content in the sulfur lean stream does not provide patentable distinction because similar sulphur absorbents are used.

(II) Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Willis and Preston, Jr. as applied to claims 1-3,5-20 above, and further in view of Carnell et al. (US 4,978439), which is given in the final rejection dated April 23, 2002. The rejection is repeated below for convenience.

Willis and Preston, Jr. disclose a method of reducing the hydrogen sulphide concentration in a fuel gas used as feed fuel for a fuel cell system as described above. The disclosure of Willis and Preston, Jr. differs from Applicant's claims in that Willis and Preston, Jr. does not specify the odorous sulfur compound in the feed stream. Carnell et al. define the organic sulphur compounds as comprising hydrogen sulphide, carbonyl sulphide, carbon disulphide, methyl mercaptan, diethyl sulphide, and tetrahydrothiophene. See Column 6, Lines 44-48. Therefore, it would have been obvious to one of ordinary skill in the art to use the method of treating a sulphur containing fuel gas disclosed by Willis and Preston, Jr. on an odorous sulfur compounds such as mercaptan, diethyl sulphide, tetrahydrothiophene and mixtures thereof, because Carnell et al. teach all these sulfur-containing compounds are functionally equivalent to the hydrogen sulphide.

(11) Response to Argument

Appellant asserts that claims 1-20 recite separating the gas into a sulfur concentrated stream and a sulfur lean stream while the Willis reference teaches combining the two streams.

It is clear in the Willis et al. reference that a membrane separation step is employed initially to divide a raw gas steam into a minor permeate stream (a sulfur-concentrated stream) and a major impermeate stream (a sulfur-lean stream). Thus, the limitation of Appellant's independent claims 1 and 11 is met. Appellant's claim does not exclude additional steps, such as the recombining step, disclosed by Willis et al.

Appellant argues that the recitation of "passing the sulfur concentrated stream back into the main fuel feed stream" in independent claims 1 and 11 is distinct from the teaching of Willis reference.

As pointed in the advisory action dated June 20, 2002, the recitation does not necessarily require the flow of sulfur concentrated stream as indicated in Figure 1 of the instant specification. The limitation encompasses feeding the sulfur-rich stream in alternate locations, as indicated in the marked-up copy of Figure 1. Thus, Willis et al. meet the claim limitation, because Willis et al. disclose passing the sulfur concentrated stream back into the mainstream, even though at a different point than intended by the application.

Appellant argues that the recitation of "the sulfur concentrated stream does not mix with the sulfur lean stream" in independent claim 19 is distinct from the teaching of Willis reference.

In response to Appellant's newly presented argument that "sulfur concentrated stream does not mix…", Willis et al. include a number of steps for the two separate streams of gas, which are not combined. See Claim 1 in the Willis reference. Thus Appellant's claim limitation is met, even though Willis included additional steps, further in the process, which include mixing

For the above reasons, it is believed that the rejections should be sustained.

Respectfully Submitted,

Dah-Wei D. Yuan
November 20, 2002

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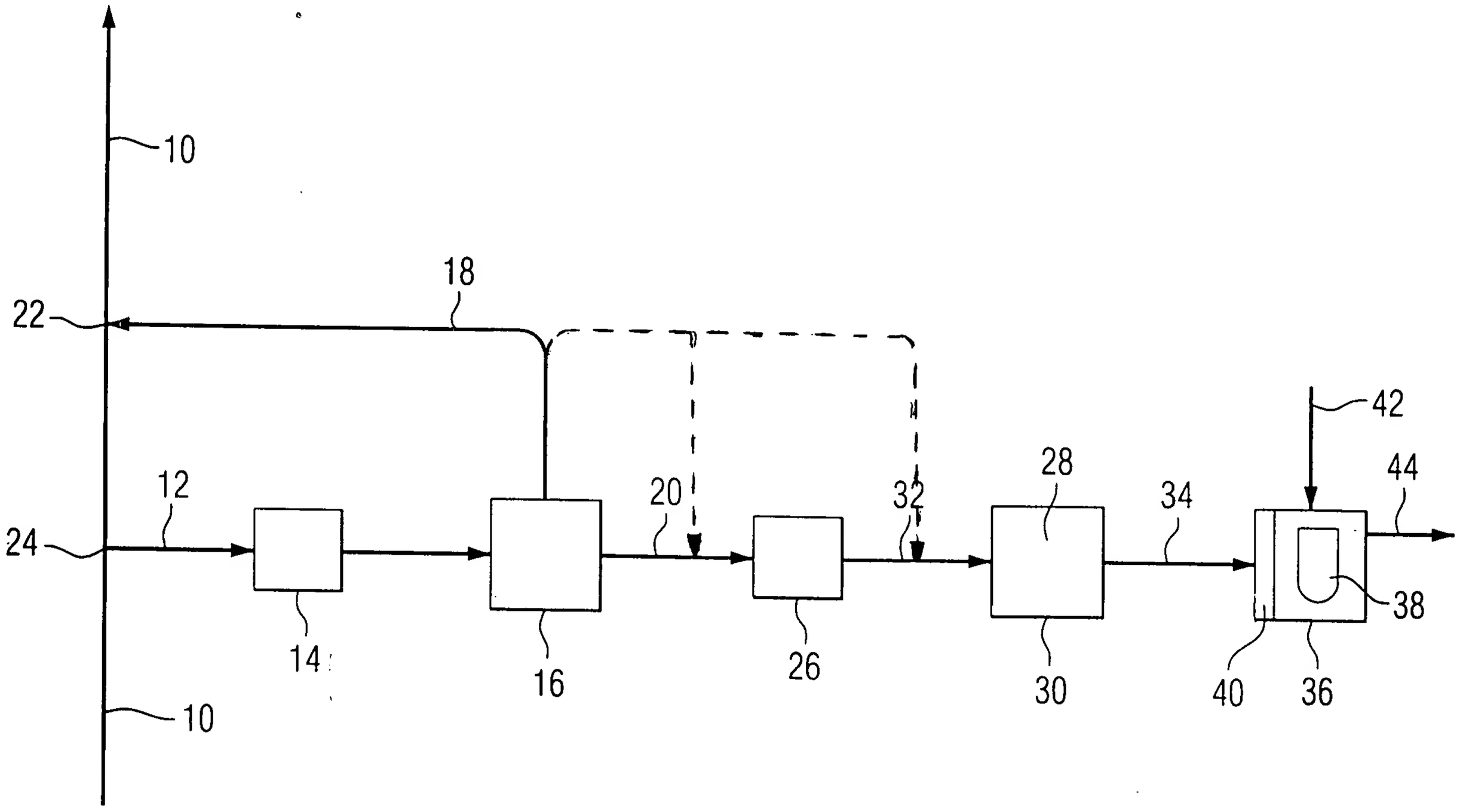
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